Calculus I

Exam 1 - Review

The first exam will cover chapters 2 and 3 of Stewart's text, *Single Variable Calculus, 6e.* Exam date is Tuesday, March 10th. The exam will include many computational problems and a proof or two. I may also explicitly ask for a definition or theorem statement, though True-False type questions might also occur. The chapter reviews provide a good source of problems for practice and consideration. As you prepare for the exam, please remember the writing expectations that I have set forth. Class-time on March 9th is devoted to your questions.

Definitions and facts to know

- Limit - "loose" definition and precise definition

- Right-hand limit and left-hand limit

- infinite limit

- continuous at a number a

- discontinuous

- removable, infinite and jump discontinuity

- tangent line

- derivative of a function f (at a number a)

- differentiable at a

- $\lim_{\theta \to 0} \frac{\sin \theta}{\theta} = 1$

Theorems to know

- The Squeeze Theorem

- The Intermediate Value Theorem

- Theorem 8 of Section 2.5

Computational problems

- Be able to find the derivative of a function using any one of the following rules: sum, difference, constant multiple, product, quotient, chain.

- Know the derivative of $\sin x$ and $\cos x$ and be able to find the derivatives of the other four trigonometric functions using some rule of differentiation.

- Be able to find a derivative using implicit differentiation.

- Solve problems from the social and natural sciences using the notion of the derivative as in Section 3.7.

- Solve related rates problems.

- Find the linearization of a function at a point a.

Proofs

- $\epsilon - \delta$ proof for computing a limit

- Be able to prove each part of Theorem 4 of Section 2.5.

- Be able to prove Theorem 5 of Section 2.5.

- Theorem 4 of Section 3.2.

- Find the derivative of a polynomial using the limit definition of the derivative.